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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,351	03/26/2004	Yoon-ho Son	5649-1253	1560
20792	7590	11/29/2005	EXAMINER	
MYERS BIGEL SIBLEY & SAJOVEC			SARKAR, ASOK K	
PO BOX 37428			ART UNIT	
RALEIGH, NC 27627			PAPER NUMBER	
			2891	

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/811,351

Applicant(s)

SON ET AL.

Examiner

Asok K. Sarkar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-16 is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/04 and 5/05</u>   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of claims 1 – 16 in the reply filed on November 9, 2009 is acknowledged.

### ***Claim Objections***

2. Claim 1 is objected to because of the following informalities: In line 4, the word "plurality" should be changed to plurality. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moise, US 2003/0030084 in view of Kelleher, US 6,069,081.

Regarding claim 1, Moise teaches a method of forming a ferroelectric memory device comprising:

- polishing an insulating layer 70 on a plurality of ferroelectric capacitors 51 and 52 to reduce a height of the insulating layer 70 above a surface of the plurality of ferroelectric to expose a polishing stop layer 72 on the surface of the plurality of ferroelectric capacitors with reference to Figs. 7A and 7B in paragraph 70.

Moise fails to teach polishing with a silica slurry to reduce a height of the insulating layer so that the surface remains covered by a portion of the insulating layer and polishing the insulating layer further with a ceria slurry to further reduce the height of the insulating layer and expose a polishing stop layer.

Kelleher teaches polishing with a silica slurry to reduce a height of the insulating layer so that the surface remains covered by a portion of the insulating layer and polishing the insulating layer further with a ceria slurry to further reduce the height of the insulating layer and expose a polishing stop layer in column 2, lines 18 – 67 with reference to Figs 1 – 5 for the benefit of planarizing the dielectric layer consisting of

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topographical variations due to covering of smaller line dimensions in column 1, lines 39 – 62.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Moise and polish the insulating layer first with a silica slurry to reduce a height of the insulating layer so that the surface remains covered by a portion of the insulating layer and then polishing the insulating layer further with a ceria slurry to further reduce the height of the insulating layer and expose a polishing stop layer for the benefit of planarizing the dielectric layer consisting of topographical variations due to covering of smaller line dimensions as taught by Kelleher in column 1, lines 39 – 62.

Regarding claim 2, Moise teaches removing the polishing stop layer to expose an upper electrode of the plurality of ferroelectric capacitors with reference to Figs 1 and 2, but fails to teach removing with an etch-back process using RF sputtering.

However, it would have been obvious to one with ordinary skill in the art at the time of the invention to remove the polishing stop layer with an etch – back process using RF sputtering for the benefit of using a low temperature and dry process without harming the electrode or the ferroelectric layer of the capacitors.

Regarding claim 3, Kelleher teaches polishing the insulating layer with a ceria slurry comprises polishing the insulating layer with the ceria slurry at a faster rate than polishing the insulating layer with the silica slurry in column 1, lines 47 – 53.

Regarding claims 4 and 5, Kelleher teaches polishing stop layer of silicon nitride in paragraph 70 but fails to mention using aluminum or titanium oxide for the layer.

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However, it would have been obvious to one with ordinary skill in the art at the time of the invention to use polishing stop layer of other materials such as aluminum or titanium oxide instead of silicon nitride since cerium oxide is a soft material and because of its high selectivity any material harder than ceria such as aluminum or titanium oxide can be used.

Regarding claim 6, Moise in view of Kelleher fails to teach plasma CVD process for depositing the polishing stop layer.

However, it would have been obvious to one with ordinary skill in the art at the time of the invention to use a low temperature deposition process such as plasma CVD process for the benefit of protecting the electrode and the ferroelectric layer of the capacitors.

Regarding claim 7, Moise teaches insulating layer of HDP silica in paragraph 70.

Regarding claim 8, Moise teaches forming a plurality of conductive patterns directly on upper surfaces of at least one pair of adjacent ones of the plurality of ferroelectric capacitors with reference to Figs 1 and 2.

### ***Allowable Subject Matter***

7. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 10 – 16 are allowed.

### ***Conclusion***

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William B. Baumeister can be reached on 571 272 1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Asok K. Sarkar  
November 23, 2005

Primary Examiner